h	m	s		°	′	″
1	20	18·9		92	38	49
1	20	37·9		92	36	55

while the places of M. Stephan are for 1860 :—

h	m	s		°	′	″
1	20	18·8		92	38	17
1	20	40·8		92	36	15

The " General Catalogue " is therefore wrong with respect to these two Nebulæ, while Auwers finds positions which agree better with the modern determinations.

Through the kindness of M. Stephan I have been able to insert these two lists of Nebulæ in my supplement to the " General Catalogue," which was read before the Royal Irish Academy in February last, and which I hope will soon be in the hands of astronomers. The numerous cases in which Marseilles nebulæ had been discovered independently by D'Arrest or Marth, have shown that M. Stephan almost always estimates the nebulæ far fainter than the other observers of nebulæ. The descriptions " eeF," " presque inobservable," &c. should therefore not deter observers from looking for these objects.

Earl of Rosse's Observatory,
    June 1877.

Note on the new Inequalities in the Moon's Longitude, pointed out by Mr. Neison. By S. Newcomb.

The inequalities in the Moon's longitude pointed out by Mr. Neison in the April No. of the *Monthly Notices*, if real, are so important, that I may be permitted to express the desire to see his computations of them published *in extenso*. They are, properly speaking, inequalities of long period in the mean longitude and in the eccentricity and perigee of the Moon, produced by the action of *Jupiter*, admitting of being expressed as follows :—

$$\delta l = + 2 \cdot 20 \sin (2\varpi - 2J),$$
$$e\delta\varpi = + 0 \cdot 58 \sin (2\varpi - 2J),$$
$$\delta e = - 0 \cdot 58 \cos (2\varpi - 2J),$$

ϖ being the longitude of the Moon's perigee, and J the mean longitude of *Jupiter*. The value of the varying angle is

$$2\varpi - 2J = 287 \overset{\circ}{\cdot} 0 + 20 \overset{\circ}{\cdot} 65 \ (t - 1800 \cdot 0),$$
$$= 239 \cdot 4 + 20 \cdot 65 \ (t - 1850 \cdot 0).$$

My present object is to show how strongly the reality of these inequalities is indicated by observations. In No. 3 of Papers

published by the Transit of *Venus* Commission, pages 20–29, I discussed an apparent inequality in the eccentricity and perigee of the Moon, having a period of about $16\frac{2}{3}$ years; an abstract of which discussion is given in the *Monthly Notices* for June, 1876. The notation used was

$$h' = -2\,\delta e,$$
$$k' = 2e\delta\varpi\,;$$

substituting δe and $e\,\delta\,\varpi$ for h' and k', the inequality indicated was

$$\delta e = 0\overset{''}{\cdot}75 \sin N,$$
$$e\delta\varpi = 0\cdot75 \cos N,$$

in which the value of N indicated by observations was

$$N = 163°\cdot2 + 21°\cdot6\,(t-1868\cdot5)\,;$$

and therefore, putting

$$N' = N + 90° = 253°\cdot2 + 21°\cdot6\,(t-1868\cdot1),$$

the inequalities were equal to

$$e\delta\varpi = -0\cdot75 \sin N',$$
$$\delta e = 0\cdot75 \cos N'.$$

We have, then, for the comparison of the angle N' derived empirically from observations, and the angle $2\varpi - 2J$ of theory

$$N' = 253\overset{\circ}{\cdot}2 + 21\overset{\circ}{\cdot}6\ (t-1868\cdot1),$$
$$2\varpi - 2J = 261\cdot4 + 20\cdot65\,(t-1868\cdot1).$$

The correspondence is so close that the identity of the two arguments does not seem to admit of reasonable doubt.

What is worthy of remark is, that the period of this argument differs but little from that of the Moon's node, so that the inequalities in question may, for many years at a time, appear to depend on the position of the Moon's node. They will therefore produce apparent inequalities like those containing the Moon's mean anomaly, and the longitude of its node, which have been deduced by the Astronomer Royal in the *Memoirs of the Royal Astronomical Society*, vol. xxix., pp. 13–15.

The inequality of mean longitude will account for the difference between the values of the inequality depending on the ellipticity of the Earth as found from theory and from observations. Hansen's theoretical value is

$$7''\cdot76 \sin \{151° + 19°\cdot34\,(t-1800)\},$$

while the Astronomer Royal found a co-efficient of $6''\cdot44$. Now, in 1800, the argument of Mr. Neison's inequality was $136°$ greater than that of Hansen. The excess increased from $71°$ in 1750

to 201° in 1850.   The effect of the new inequality was, it will be seen, to diminish the apparent inequality due to the ellipticity of the Earth during the period 1770–1850, the diminution being zero at the first epoch, and attaining its maximum of 2″·2 between 1840 and 1850.

A more definite statement of the support which the observations give to the inequality of longitude cannot be expressed without a more continuous comparison of Hansen's tables with observations than now exists.

On the Spectra of Comets b and c, 1877.   By Lord Lindsay.

Already, on April 11, the spectrum of Winnecke's Comet, (*b* 1877) was seen to consist of three bright lines.   Under a very low dispersive power these seemed to be connected by the very narrow continuous spectrum of the nucleus ; but on subsequently applying a higher power it was obvious that, although the lines were much widened when the image of the nucleus fell on the slit, still the spectrum was broken up into three lines separated by wide dark intervals.

Measures were obtained with a Browning single prism spectroscope, on April 18, by Copeland and G. Lohse : the resulting wave-lengths in millionths of a millimeter are

556·0   Very faint line.

516·0   Bright line abruptly terminated on the side next the red, but gradually fading away towards the violet.

472·2   Faint line, somewhat sharply bounded towards the red.

On May 5 the same instrument gave wave-lengths 558·0, 508·6, 467·9 ; the lines being much the same as before.

The following night was very clear, and by using a very low eye-piece the lines were found to be visible, even in a Grubb spectroscope with a large compound prism.   The least refrangible of the three lines was now found to be separated into at least three very faint lines, *see figure*.   A series of measures gave the wave-lengths as follows :—

569·6   Very faint line.

559·3 ⎫
      ⎬ Very faint band.   These form parts of one band.
550·0 ⎭

543·2   Very faint line.

517·5 ⎫
      ⎬ Limits of brightest line.
498·6 ⎭

513·4   Brightest part of brightest line.

510·7   Centre of light of brightest line.

470·5   Brightest part of faintest line.